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ABSTRACT

Over the past several years, the preeminence of the transfer function at Arizona's Mesa Community College (MCC) has been overshadowed by the increasing demand for remedial education. In fall 1992, 65% of the students assessed for placement in English, mathematics, and reading scored below college-level in at least one of these subjects, and enrollment in courses below college-level accounts for almost 30% of the total college enrollment. To meet the remediation needs of students while limiting the fiscal impact of remedial programs, MCC developed a pilot multimedia basic skills program, integrating educational technology into self-paced, open-exit remedial courses. Although students move at their own pace and work independently, they do not necessarily work alone. Interactions can take the form of student-student interactions, including students soliciting the advice of others, assisting others with their work, and tutoring students who are not as far in the program; one-on-one teacher-student interactions, focusing on specific student needs instead of providing a generalized lecture format; and small group and whole class teacher-student interactions, such as the use of traditional teaching methods among which are lecturing and homework assignments, modified to accompany the new curriculum designed for use with the computer network. (MAB)

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AN ANATOMY OF AN INNOVATION:

BALANCING THE NEEDS OF DEVELOPMENTAL STUDENTS WITH THE NEEDS OF AN INSTITUTION

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Biographies of Presenters

Chair of the committee, Dr. Gail Mee, serves as Associate Dean of Mathematics, Science, and Physical Education at Mesa Community College. Faculty members of Mesa Community College are Terri Martinez and Raquel Leyva, professors of reading; Laurel Howard, Pat O'Brien, and Victor Cornell, professors of Mathematics; Tim Florschuetz and Debbie Reinders, professors of English; Gene Fazio professor of English and reading.

Mesa Community College is located in metropolitan Phoenix, Arizona. Since its founding in the early 1960s, it has grown significantly. More than 22,000 credit students now enroll at the college each semester. It is anticipated that the population in the surrounding area will double within the next ten to fifteen years and that college enrollment will grow proportionally.

Students at the college are representative of students at most community colleges today. Their average age is 27, and 54% are female. The ethnic and racial composition of the student population is similar to that of the local community. It is predominantly white, with a growing number of minorities, particularly Hispanics. In Fall 1994, 20% of the students at the college were members of minority groups.

As with most colleges and universities in the past few years, Mesa has been limited by significant budget restrictions. Recently, a bond referendum was approved at the polls, providing the college with new resources to build and improve facilities and upgrade technology and equipment. However, operating monies are still scarce. And, like other colleges and universities, this college is also experiencing increasing demands for accountability from outside agencies, such as its regional accrediting agency and the state legislature.

Mesa is a comprehensive community college offering an extensive array of academic and technical programs. Its mission is broad and includes those curricular functions that define most community colleges. Cohen and Brawer describe those functions as "academic transfer preparation, vocational-technical education, continuing education, remedial education, and community service"(16).

Because of the college's close proximity to the state university, located only a few miles away, the transfer function of the college appears to dominate all others. Many students at the community college are concurrently enrolled at the university or intend to transfer and are taking courses for a variety of reasons: less expensive tuition, availability of classes and conveniently scheduled sections, or the opportunity to improve their academic standing and thus improve their chances for admission.

Within the past several years, the preeminence of the transfer function at the college has been overshadowed by the increasing demand for remedial education. In Fall, 1992, 65% of the students assessed for placement in English, mathematics, and reading scored below college-level in at least one of these subjects. Enrollment in courses below college-level accounts for almost 30% of the total college enrollment. Data also show that many students are not always successful in these courses or in subsequent courses.

Statistics such as these have captured the president's attention. He sees efforts at remediation placing increasing demands on already scarce resources without concomitant student success. This concern has prompted him to request a new solution to "the basic skills problem." English, math, and reading faculty were selected to meet this demand by integrating technology into self-paced, open-exit classes.

When instructors think of approaching the use of technology in the classroom, some may think of isolated student learning or electronic programmed instruction. However, faculty soon recognize that technology can be a tool that enables them to provide students with more, not less, attention.

The similarity of the approaches to classroom management by the three disciplines far outweighs the differences in these classes. Each discipline basically creates a non-lecture environment after the first few weeks of the semester. This promotes more student-to-teacher contact, student-to-student interaction, or small-group interaction.

The premise of the pilot is to move students at their own pace and offer the opportunity to exit as quickly or patiently as the requirements are met. Ideally, students should be highly motivated, and disciplined (self-starters) to exit the program with success. Students not possessing these attributes quickly realize they have to acquire them to complete the class with a desired level of success.

Student-Student Interactions. Tutorial programs, word processors, and self-directed student assignments create a workshop environment that enables students to work independently at their own pace. However, working independently does not mean that each student works alone. For example, English students composing on word processors usually receive comments and advice as they read their work to each other. Math students working on the same topics help each other discover and learn the steps used to solve problems. Students who have mastered a concept serve as tutors to those students who are having difficulty learning that concept.

Teacher-Student Interactions--One-on-One. Rather than spending the majority of class time lecturing, teachers, in a workshop environment, help students *while* they are in the process of completing an assignment, doing a problem, or working on a tutorial. In English classes, networked computers allow the teacher at a central computer to view each student's work. This same technology even allows the teacher, without ever leaving the central computer, to provide comments to students. This innovation allows teachers to help more students in less time. In addition, students have written comments.

Software tutorials in English, math, and reading provide students with diagnostic feedback, allowing teachers to maximize their time in individual conferences with students. English students work on the software programs *Grammar Tools* and *Writing Tutor*, which were developed by faculty at MCC. The diagnostic score sheet, printed explanations, and customized homework assignments allow a teacher to clarify areas of confusion and to check student mastery of a skill or concept. Similarly, reading students must complete two textbooks, *Ten Steps to Advancing Reading Skills* and *Advancing Vocabulary Skills* during the semester. The reading department utilizes an assignment check-off sheet that guides students through the course on an individual basis. Students are checked-off by the instructor on all homework assignments, then proceed to computer exercises or quizzes and finally to paper mastery tests.

Most importantly, the software tutorials and self-directed student assignments free the teacher for one-on-one conferences in the classroom. In these conferences, teachers can help students while they are in the process of completing a task. An English student may, for instance, need the teacher to go over directions in a particular assignment, offer ideas for support, or suggest a better way to express a reason. Math teachers have individual conferences with each student after every test they take. Students receive one-on-one feedback on what they are doing right as well as individualized instruction. Students are given a customized homework assignment based on their pretest over a module including sections they can work on using the computer tutorial, *InterAct Math*. Students continue in a module until all the objectives of that module are mastered. This forces the students to have mastered <u>all</u> the prereequisite skills before proceeding to the next level of mathematics. A student in reading having difficulty with main ideas may benefit tremendously by going through some exercises with the teacher.

<u>Teacher-Student Interactions--Small Group and Whole Class.</u>

Technology has also helped instructors meet individual needs in small group and whole class instruction. Through testing and homework, including using the computer tutorials, students with the same needs can be identified and small group instruction can take place. Any instructor may incorporate a whole-group approach at certain intervals. The networked computers allow English teachers to easily project student compositions from individual computers onto a screen through the use of the Lite-Pro. Positive comments motivate the individual student to better writing and simultaneously provide examples of word choice, clarity, and other items for other students.

In this continued effort to integrate and decompartmentalize disciplines, thereby allowing students to see and understand first hand the unity of academia, English, math, and reading faculty developed a multi-media unit for the Basic Skills pilot program entitled *Pueblo Grande*. This interactive software is based upon the historical site in Phoenix of the same name, a natural, cultural museum preserving the remains of the mysteriously vanishing Hohokam Indian tribe. After considerable brainstorming, much debate, and a visit to the museum, MCC faculty finally decided upon an archaeological dig of an unexcavated portion of the Pueblo Grande Museum to illustrate the importance of a combination of academic skills, to foster and develop critical thinking, and to give students a chance to learn about the culture and history of Arizona.

In a highly collaborative atmosphere, students take on the role of archaeologists and work together through a computer simulated excavation to unearth features and artifacts, discussing many different facets of the Hohokam society. Students view videos, listen to audio cassettes, and peruse literature donated by the museum prior to the actual dig. Also, an Introduction to Archaeology (an interactive/informative computer program created by MCC's own Richard Effland) provides the students with a background in general archaeology. Whether or not the students actually visit the site, the multi-media unit provides a simulated visit, historical and cultural information, and archaeological facts and figures, thrusting the student into the role of the archaeologist: a reader, a writer, a mathematician, and a critical thinker.

Initially, students are exposed to new vocabulary and main ideas through several vehicles of delivery, capitalizing on the learning style theories. Videos, audio cassettes, diagrams, pamphlets, articles, and computer software (visual and auditory) are all required and expose developmental students to information literacy. Students keep a journal of notes, vocabulary, and any information necessary for writing a report after the dig. Students are urged to reproduce the new terminology they have learned. At the outset of the dig, students receive a budget, a normal part of such endeavors. As in reality, students must keep within their budget while hunting for buried historic clues.

During the actual excavation (simulated with the interactive software), students unearth a variety of structures such as canals, ovens, and different types of houses and a variety of artifacts such as pottery, culinary tools, and jewelry. Pollen samples are also obtained to indicate agricultural habits. A radiocarbon dating analysis helps students to orient their findings within the given timeline. Obviously, aside from the budget, there is a plethora of mathematical applications; from figuring out the areas of house to the median of change of this area over time to graphing

applications, instructors have many choices for specific tasks. Since no two digs offer the same results, many figures are produced to plug into certain equations.

Collaboratively interpreting data, sorting facts and figures, and formulating a hypotheses through critically analyzing all of the information, students end the Pueblo Grande project with a report. Instructors have the option to impose strict guidelines for this piece or simply allow students to informally write a final journal piece. For example, English instructors most likely demand a formal final composition (being the crux of the assignment and grade) whereas math instructors may demand more mathematical applications and less writing to constitute the grade for the project. Students, as well as instructors, have many choices throughout this project, once again resulting in a real life experience.

Because Mesa Community College retains the vision of technology and innovation, faculty are dedicated to provide imaginative and even daring curriculum to their charge of rejuvenating the basic skills program. As John Roueche, Director of Community College Education at University of Texas at Austin, maintains: "Specifically, there are four major principles for making intelligent and sensitive curricular decisions:

1. The content must have *utility* for the learner.
2. The content should exhibit *relevance* to the learner's life.
3. The content must be susceptible to *multisensory* approaches.
4. The content must be receptive to *holistic*, *eclectic*, and *cross-disciplinary* thrusts"(15).

Works Cited

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